REMARKS

This is in response to the Official Action currently outstanding with respect to the above-identified application, which Official Action the Examiner has designated as being Final.

Claims 1-23 were present in this application as of the time of the issuance of the currently outstanding Official Action. Claims 1-23 stand rejected by the Examiner. By the foregoing Amendment, Applicant proposes that Claims 1-23 be cancelled; New Claims 24-58 be added and that no claims be amended. Accordingly, in the event that the Examiner grants entry of the foregoing Amendment, Claims 24-58 will constitute the claims under active prosecution in this application. Applicant respectfully submits that new claims 24-58 do not introduce any new matter into this application. Further, Applicant respectfully submits that the cancellation of claims 1-23 and the substitution of claims 24-58 therefor place the present application in condition for allowance, or at least in better form for Appeal, as required by 37 CFR 1.116 without introducing any new issues into this application requiring further consideration and/or search by the Examiner.

The claims as they will stand in the event that the Examiner grants entry to the foregoing Amendment After Final Rejection Under 37 CFR 1.116 are set forth hereinabove as required by the Rules.

More specifically, it is noted that in the currently outstanding Official Action, the Examiner has:

1. Acknowledged Applicants' claim for foreign priority under 35 USC 119(a)-(d), and indicated that the required certified copies of the priority document have been received by the United States Patent and Trademark Office;

2. Indicated his acceptance of the drawing changes proposed in Applicant's communication of 21 April 2003;

3. Objected to the drawings on the bases that the drawings as filed fail to show every feature of the invention specified in the claims, i.e., the drawings as filed fail to show (i) "the voltages supplied to the pixel electrode have a positive polarity and a negative polarity with respect to a potential level of the counter electrode during the display of image" as in presently pending Claims 1, 2, 10 and 11; (ii) "scan start signal supplying means for ... supply period" as in presently pending Claim 16, lines 9-14; and (iii) "the supply control means outputs a control signal for setting the latch circuit number 'm' to ... external" as in presently pending Claim 18, lines 5-8, and required appropriate correction;

4. Rejected Claims 1-23 under 35 USC 112, first and second paragraphs, on the bases that the wording of the independent claims to the effect that "the voltages supplied to the pixel electrode have a positive polarity and a negative polarity with respect to a potential level of the counter electrode during the display of image" was neither described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s) at the time that the present invention was made were in possession of the claimed invention, nor sufficiently definite in that the wording in question fails to particularly point out and distinctly claim the subject matter which applicant regards as the invention;

5. Rejected Claims 1, 5, 7, 9, 10, 14, 19, 20 and 21 under 35 USC 102(b) as being anticipated by the Verhulst reference (U.S. Patent No. 5,627,560);

6. Rejected Claims 2-4, 8, 11 and 15 under 35 USC 102(b) as being anticipated by the so-called "Verhulst II" reference (WO97/31362);

9. Rejected Claims 16-18 under 35 USC 103(a) as being unpatentable over the so-called "Verhulst II" reference (WO97/31362) as applied to Claim 15;

10. Rejected Claims 6 and 13 under 35 USC 103(a) as being unpatentable over the Verhulst reference (U.S. Patent No. 5,627,560) in view of the Crossland reference (U.S. Patent No. 4,655,550);

11. Rejected Claim 12 under 35 USC 103(a) as being unpatentable over the Verhulst reference (U.S. Patent No. 5,627,560) in view of the Okada et al reference (U.S. Patent No. 4,778,260);

12. Rejected Claim 21 under 35 USC 103(a) as being unpatentable over the Verhulst reference (U.S. Patent No. 5,627,560) in view of the Kuga reference (EP Patent No. 0 655 725 A1);

13. Rejected Claim 22 under 35 USC 103(a) as being unpatentable over the Verhulst reference (U.S. Patent No. 5,627,560) in view of the Motomura et al reference (EP Patent No. 0 730 371 A2); and

13. Commented upon Applicant's prior response in this application (i) accepting Applicant's proposed drawing changes submitted with his last communication in this application; (ii) maintaining his objections to the drawings for failing to show certain features of Claims 16 and 18; (iii) noting that Applicant's reference to the difference in the nature of the liquid crystal material between the cited references and the present invention is not specifically recited in the present claims; (iv) agreeing that Verhulst teaches pixels driven only by a negative voltage and reset only by a positive neutralizing voltage, but suggesting that the presently pending claims do not distinguish from the references in this regard as well as maintaining that the Verhulst references anticipate the feature of the present invention that the pixel electrode has positive and negative polarity relative to the polarity of the counter electrode.

Further comment in these Remarks regarding items 1-3 and 13 above is not considered to be necessary in these Remarks.

With respect to item 4, it is the Examiner's assertion that certain elements of the claims are not present in the drawings thereby requiring either their addition to the drawings or cancellation from the claims. Applicants respectfully **traverse** the Examiner's objections to the drawings as they will stand upon the incorporation of the changes heretofore approved by the Examiner. The bases of this traversal are as follows.

First, with respect to the relative polarities of the pixel electrode and the counter electrode, Applicant respectfully submits that the specification and claims of this application are both completely and definitely clear to the effect that the polarity of the counter electrode is maintained constant during the operation of the claimed device. As noted previously, no multiplexing circuit is associated with the counter electrode in the present invention as is the case in the cited references. Further, the present specification at several points indicates that the standard VGA display is changed as little as possible by the present invention. Hence, no disclosure even remotely suggests otherwise, no one of ordinary skill in the art would in any way be lead to believe otherwise, and the phraseology chosen with respect to the relationship of the polarities of the pixel electrode and the counter electrode (along with the remaining overall teachings of the present specification discussed previously and below) consistently refer to ***the*** potential of the counter electrode. In these circumstances, it is respectfully submitted that the potential level of the counter electrode must be understood as being (i.e., cannot be considered other than being) constant. Further, the Examiner has not objected to presently pending Claim 9 on the basis that the relationships therein claimed are not shown in the drawings. Applicant respectfully submits that the same standard should be applied to the wording of the presently pending independent claims of this application.

Further, as mentioned in Applicant's previous response, the "scan start signal" generation is clearly disclosed in the specification as taking place in the display control section 20 (see page 30, line 25 to page 31, line 4). In addition, one of the output lines from the display control section 20 in Fig. 1 is already labeled "scan start signal". The Examiner's suggestion that the indication that the "scan start signal supplying means for supplying the scan start signal to the first latch circuit of the shift register" of the row line driver is missing from the drawings of this application, therefore, seems somewhat strained. This is because at page 34, lines 5-25 of the present specification it is clearly indicated that the gate driver 13 depicted in Fig. 4 includes the shift register claimed. Hence, Applicant respectfully submits that the gate driver 13 corresponds to the row line driver claimed and is representative of the first, second and third gate drivers 13a, 13b and 13c shown in Fig. 1. Fig. 1 clearly shows a scan start signal being transferred from display control section 20 to each of the gate drivers. Further, Fig. 4 clearly shows an input line extending into the gate driver 13 also labeled "scan start signal" with an arrow head abutting the left-hand edge of the shift register 41 where the first latch circuit would be expected to be located (see, phantom representative latch circuit added previously and approved by the Examiner). Hence, the just described line connection ("scan start signal supplying means") portion of the gate (row line) driver clearly acts to supply the scan start signal to the shift register in the row line driver. Accordingly, Applicants respectfully submit that the drawings already contain the required showing of the scan start signal supplying means, and also that this showing would be clear to anyone skilled in the art at the time the present invention was made and later. Accordingly, Applicants respectfully submit that a further more specific showing of this fact in the drawings should not be required. A decision withdrawing the Examiner's requirement for a drawing amendment in this regard in response to this communication, therefore, is respectfully requested.

Similarly, the supply control means is the display control section 20, and the latch circuits are now representatively shown in phantom in Fig. 4 within the shift register 41 with their inputs being determined by the switch 43 that operates in conjunction with an input from the discrimination circuit (i.e., external). The output lines from the shift register clearly allow and imply the location of the mth circuit to be determined by one skilled in the art (see also in this regard the timing charts). Accordingly, Applicants respectfully submit that the portions of claims referenced by the Examiner are already present in the drawings as originally filed. A decision so holding is respectfully requested.

Accordingly, the foregoing response to the Examiner's requirement for a further amendment to the drawings of this application in combination with the set of new formal drawings incorporating the changes previously approved by the Examiner submitted herewith are respectfully submitted to completely overcome the Examiner's objections to the drawings stated in the currently outstanding Official Action. Consequently, a decision so holding in response to this communication is respectfully requested.

With respect to item 4 above, Applicants now are proposing to specifically claim that the display voltages applied to the pixel electrodes may have either a positive or a negative polarity with respect to the potential level of the counter electrode during the display of images (see, proposed new claims 30 and 46). It is respectfully submitted that this alteration of the presentation and phraseology of the claims of this application removes any implication that the voltage on the pixel electrodes could be positive ***and*** negative relative to the potential of the counter electrode ***at the same time*** as the Examiner suggested the previously presented claims could be interpreted as saying.

The Examiner's rejection under 35 USC 112, first paragraph, also is respectfully ***traversed***. It is true that Applicants have provided no voltage wave diagrams or the like showing the relationship here at issue. Applicants nevertheless respectfully submit, however, that no such drawings should be required for the reasons set forth hereinabove. Further, Applicants again respectfully note that the Examiner has failed to object to the portions of the specification cited by the Applicants in support of the wording in question as being indefinite or otherwise insufficient, or to reject presently pending Claim 9 on the grounds now asserted against Claims 1, 2, 10 and 11.

The simple fact is, therefore, that the structure is fully disclosed in both the specification and claims as they presently stand (and will stand upon the entry of the foregoing Amendment). Further, it is abundantly clear that the potential level of the counter electrode is understood to be constant unlike the potential level of the counter electrode controlled by a multiplexing circuit in the cited references. In such a case, the specification of the relationships of the power supply voltages that may be applied to the pixel electrodes via the source drivers to each other when the pixel electrode polarity is either positive or negative relative to the counter electrode potential is clearly shown by the mathematical relationships provided. There is absolutely no useful purpose that could be attributed to illustratively depicting (i.e., inserting into the drawings verbatim from the specification) these clear mathematical relationships, and Applicants respectfully submit that such should not be required. A decision so holding in response to this communication is respectfully requested.

With respect to the Examiner's substantive rejections, all of which being dependent upon the Verhulst and/or the Verhulst II references, Applicants respectfully present the following comments for the Examiner's consideration in connection with the new claim set presented above.

The present invention is directed to a driving method that provides a reduction of the blur at the edge of the displayed image when a motion picture is displayed on a conventional liquid crystal display (e.g., TN LCD). In this regard it will be recognized that a conventional liquid crystal display is often referred to as a "hold type" display since the pixels hold a predetermined data signal during a fixed period (typically one-frame period). On the other hand, a conventional CRT display utilizes a fluorescent substance that emits light in response to a scanning electron beam. The luminescence period of that fluorescent substance is short and thus each pixel emits light in the form of pulses. Accordingly, the display method of a conventional CRT is often referred to as an "impulse type" display method to distinguish it from the display method of a liquid crystal display.

The conventional "hold drive" display method has the problem that a blur occurs at the edge of the image, when the liquid crystal display displays a motion picture as described in the present specification. In order to solve this problem, the present invention provides a new method for driving a "hold drive" type display (liquid crystal display) in which a black display is inserted within the period between sequential refreshments of the display (typically a so-called "frame period"). This method is often referred to in the art as a "false impulse" (or "Pseudo-Impulse") drive method.

Heretofore, in order to perform a conventional "impulse drive" method, it has been necessary that the liquid crystal display device include numerous special and costly features, such as display screen division. However, it is a benefit of the present invention that the liquid crystal display of the present method can accomplish the desired impulse drive with simple and less costly construction.

With this background, it will be understood that the "Verhulst" and "Verhulst II" (WO 97/31362) references relate to the display devices that utilize liquid crystal materials that have spontaneous polarization characteristics (typically ferroelectric liquid crystal materials). Although these types of devices include features such as a high-speed response and/or memory nature due to the spontaneous polarization, to the best of Applicants' knowledge displays using ferroelectric liquid crystal materials are not commercialized at present for various reasons. The present invention, on the other hand, is directed to improvements in the motion picture display quality of liquid crystal display devices of the type that are currently widely used. It ***does not*** relate to a ferroelectric liquid crystal device such as those disclosed by the Verhulst references.

Accordingly, those skilled in the art are well aware that if data writing is performed in a liquid crystal display device having the state where the electric charge by spontaneous polarization remains in pixels, the desired display state (transmittance) is not attained. This is the case in the ferroelectric liquid crystal display devices. Therefore, in order to solve this problem the driving methods of the "Verhulst" or "Verhulst II" references include a reset voltage (black display voltage) that is applied before performing data writing. This reset voltage is applied in order to reset the electric state of the electric charge due to the spontaneous polarization. Consequently, the technology described in the "Verhulst" or "Verhulst II" references is completely unrelated to the impulse drive technology of the present invention.

In order to more clearly distinguish the present invention from the driving method disclosed by "Verhulst" or "Verhulst II", Applicants hereinabove have proposed a new set of claims that are respectfully submitted to clarify the previous phraseology without introducing any new issues into this prosecution. The following discussion is directed to these newly phrased claims.

Specifically, new claim 24 recites the method that includes:

(a) a step for supplying a select signal to one of row lines from nth row line to n+mth (n>0, m>1) row line of the plurality of row lines and also supplying respective data signals to each of the plurality of column lines, thereby supplying the respective data signal to pixels corresponding to the one of the row lines of the plurality of pixels; and

(b) a step for, before or after step (a), supplying a select signal to at least one of the row lines from 1th (1>n+m, or 1+m<n) row line to 1+mth row line of the plurality of row lines, and also supplying a black display signal to each of the plurality of column lines, thereby supplying the black display signal to pixels corresponding to the least one of the row lines of the plurality of pixels.

In this regard, it is to be noted that "Verhulst II" only describes a driving method where m=1 in claim 1. That is, the data writing is performed right after the application of the reset signal in "Verhulst II".

As for "Verhulst" reference, Applicants respectfully submit that "Verhulst" discloses m=8 based on Fig. 4C of that reference. That Fig. 4C shows that 8 reset signals are applied before the data writing is performed, although the data writing is performed right after the application of the reset signals (i.e., right after the 8th reset signal). Further, in the "Verhulst" reference, the 8 reset signals are applied in such a way as to completely reset the electric state of the electric charge due to the spontaneous polarization of the ferroelectric liquid crystal material, also as shown in Fig. 4C. Those skilled in the art will readily recognize that the time period for applying 8 reset signals (m=8) is too short to obtain the effect of impulse drive.

In addition, in order to still more clearly distinguish the present invention from the "Verhulst" reference, new claim 24 further recites that "each of the plurality of pixels holds a state, in which the black display signal is supplied, for at least the time period corresponding to one-fourth of one frame period". Support for this language may be found in Figs. 25-27 and corresponding description of the present specification (i.e., the row lines are divided into 4 groups).

Accordingly, once it is understood that both the "Verhulst" and "Verhulst II" references are limited to "liquid crystal materials having spontaneous polarization" that are quite different from the materials of the liquid crystal of the present invention, the inapposite nature of the teachings of the Verhulst references to the disclosures and claims of the present application is immediately apparent.

Nevertheless, in the foregoing Amendment, Applicants have introduced several further limitations to distinguish the invention from "Verhulst" and "Verhulst II". For example, Applicants now have proposed the inclusion of the limitation: "each of the plurality of pixels holds a state, in which the black display signal is supplied, for at least the time period corresponding to one-forth of one frame period" in method claim 24 and a comparable limitation in apparatus claim 40. Further, Applicants have stated that "m>115" in both method claim 25 and apparatus claim 41. Support for m>115 may be found on page 39, line 7 of the instant specification.

In view of the foregoing Remarks, it is believed that the Examiner will now understand the significant difference between the present invention and the prior art currently relied upon to reject this application. Further, it is believed that the Examiner will recognize that the foregoing new claim set covers the same subject matter as the previous claim set, but in a more clearly phrased way. Accordingly, Applicants respectfully submit that entry of the foregoing Amendment will not require further consideration and/or search in excess of that normally conducted by the Examiner as a so-called "update" search prior to the actual allowance of any application. Hence, the foregoing Amendment places this application in condition for allowance, or at least in better form for appeal as required by 37 CFR 1.116.

In this state of the present application, reconsideration and allowance are respectfully submitted to be appropriate and, therefore, are respectfully requested in response to this communication.

Finally, Applicants believe that additional fees are not required in connection with the consideration of this response to the currently outstanding Official Action. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge and/or credit Deposit Account No. **04-1105**, as necessary, for the correct payment of all fees which may be due in connection with the filing and consideration of this communication.

Respectfully submitted,

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